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HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE
Andrews Air Force Base
Washington 25, D. C.

OFFICE OF
THE COMMANDER

15 September 1959

General Thomas D. White
Chief of Staff
United States Air Force
Washington 25, D. C.

Dear General White:

The gravity of recent decisions placing severe administrative and funding restrictions on the MIDAS development program compels me to bring my views to your personal attention. These restrictions will, with certainty, delay the attainment of an operating system capable of warning the nation of a ballistic missile attack. I regard the problem of adequate warning of a ballistic missile attack as a matter of the greatest national urgency requiring the strongest combined efforts of our military and industrial base to achieve the earliest possible operational capability. The attached memorandum for the Secretary of Defense from Under Secretary of the Air Force MacIntyre, and letters to you from General Power and to the Joint Chiefs from General Partridge fully support this view.

It appears that the best means of detecting ballistic missiles is at the initial stage of their launch, using infra-red equipped satellites. The relative immunity of MIDAS to known countermeasures suggests its joint employment with radar systems in a mutual support role to provide effective and reliable warning and defense for national survival.

There have been many technical evaluations of MIDAS during the past year. The attached reports of two formally constituted ad hoc groups composed of outstanding scientific persons confirm the technical feasibility of the MIDAS development and recommend that it be pursued with the highest priority.

The urgency and importance of achieving national defense requirements and the reasonable certainty of technical feasibility strongly justifies that the concurrent development approach with which you are familiar be

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followed on the MIDAS program. This method of management requires adequate funding and streamlined administrative procedures at all levels in order that the potential offered by this system will be exploited fully and expeditiously. However, the program is presently inadequately funded to permit concurrent development. The FY '60 estimate to properly fund the program is $109.7 M, yet only $46.9 M has been approved. Even if this deficiency was overcome in FY '61, I estimate that the program will slip about one year behind schedule.

Recently the Air Staff has expressed the willingness to fund the program as presented by AFBMD to the Air Council and ARPA. There is an understandable reluctance however to accomplish internal Air Force reprogramming for a space development program which is not fully approved by the Defense Department.

With the present Department of Defense and Air Force administrative and management arrangements, it has become virtually impossible to get approval for, and implement, a development plan without experiencing undesirable delays and severe program readjustments. Waste of money and loss of valuable time are the inevitable result.

I strongly recommend, therefore, that you obtain from Dr. York a positive decision to proceed with MIDAS as an operational system in order that the Air Force can continue concurrently with research and development and with the operational support aspects of the program. In this way, we can assure the earliest possible availability of a missile detection and alarm weapon system.

Sincerely

B. A. Schriever

B. A. SCHRIEVER
Lieutenant General, USAF
Commander

5 Incls:
1. Memo Sec'y Def
   12 Feb 59 (S)
2. Ltr to CofS (USAF)
   8 Nov 58 (S)
3. Ltr to JCOS
   16 Dec 59 (S)
4. Rep ad hoc TAB
   26 Feb 59 (S)
5. Excerpts ad hoc ADS
   15 Jan 59 (S)

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Re-written by Mr. Macintyre,
12 Feb 59/hc

12 Feb 59

MEMORANDUM FOR SECRETARY OF DEFENSE

As you know, the Air Force and ARPA have been carrying on a sustaining development program in the field of infra-red detection satellites. This modest program has been continued in order to sustain contractual work effort and personnel until such time as complete technical evaluation and program parameters could be studied and agreed upon.

In the past months, the Air Force, in conjunction with ARPA, definitized the MIDAS program which would initiate full scale accelerated development to attain an early capability in this field.

Presentations have been made to the Joint Chiefs of Staff and to the Ad Hoc Technical Advisory Board of ARPA. In addition, complete program and technical details have been discussed with various representatives from your office. The Joint Chiefs of Staff and the Technical Advisory Board have informally indicated complete approval as to the technical feasibility and operational requirement for this system and have both endorsed development and test flights on a top priority basis. The Air Force feels that this system is highly necessary as a part of the U. S. early warning network to provide immediate missile launch indications.

It is my understanding that the Director of ARPA has requested your approval and augmentation of funding for this program. In addition, the Air Force will reprogram available funds in order to proceed with the complete FY 1959 program.

I would like to reemphasize the Air Force position as to the urgency of development of this system and its capability to achieve the very early warning so necessary to air defense and our retaliatory capability.

It is requested that expeditious action be taken to approve the MIDAS program and fund augmentation as requested by the Director of ARPA in order to attain the presently planned flight test and other technical

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schedules. The Air Force considers this project to be of the highest priority and that, as far as the Air Force is concerned, ARPA's request for Emergency Funds for this project is to be considered a prior claim to any Air Force requests for Emergency Funds.

Signed
Malcolm A. MacIntyre
Under Secretary

Distribution
Mr. Roy Johnson
Gen Roscoe Wilson
Gen McCorkle
Chief of Staff
Gen Friedman
Mr. Raymer
Mr. Garlock

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Nov 8 1958

SUBJECT: (U) Priority of WS 117L Program for Early Warning

TO:
Chief of Staff, USAF
Headquarters USAF
Washington 25, D. C.

1. A status report by the AFBMD to the 21 October 1958 WS 117L Weapon System Phasing Group revealed a serious program deficiency. The infrared effort was found to exist on a minimum sustaining basis with possible program termination by 15 December 1958. Since this program offers the greatest single potential for warning, extraordinary means to preserve it are considered justified. (S)

2. This command has indorsed the military exploitation of space and recognizes the contribution of the biomedical program now a part of the WS 117L development effort. However, an earlier, more significant, military contribution may be realized by adjustment of priorities to emphasize the warning need. The warning capability should be supported with priority over the biomedical. All WS 117L sensors now being developed should enjoy equal priority since they are mutually supporting in the warning role. However, on a last resort basis, with provision that reliability and availability are positively established, the infrared program should be afforded priority over all others. (S)

3. This correspondence classified Secret to protect information regarding future missile programs. (U)

THOMAS S. POWER
General, USAF
Commander in Chief

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Headquarters
North American Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

16 December 1958

SUBJECT: WS-117L Infrared Satellite Program (S)

TO: Joint Chiefs of Staff
Washington 25, D. C.

1. On 30 April 1958, CINCNORAD wrote the Chief of Staff USAF, as Executive Agent for NORAD, recommending the accelerated development of an alternate means of detection for ICBM and suggested that a possible solution might be available in the infrared version of the WS-117L Project.

2. Since that time we have been briefed on this subject by the staff of the Ballistics Missiles Division of the Air Force and have also discussed it with Mr. Roy W. Johnson and his staff from the Advanced Research Project Agency. As a result of these discussions, it seems evident that the development of the WS-117L infrared tracking system is a feasible and practical possibility.

3. It should be emphasized that recent developments in protective coatings, reduction in cross-sectional area of nose-cones, susceptibility to electronic warfare, the sorting problem to eliminate decoys and other space objects and restrictions imposed by site selections may significantly reduce the effectiveness of any system based upon radar. It is essential that an alternate means of early warning of approaching ballistic missiles, complementary to radar, be developed. If the infrared version of WS-117L lives up to its design specifications, it will meet our requirements in providing an independent system of high accuracy, reliability and immunity to known countermeasures.

4. It is strongly recommended that the development of the WS-117L infrared tracking system be treated as a matter of the highest urgency.

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C/S USAF as Exec.
Agent for NORAD

E. E. PARTRIDGE
General, USAF
Commander-in-Chief

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REPORT OF THE AD HOC TECHNICAL ADVISORY BOARD

to the

ADVANCED RESEARCH PROJECTS AGENCY

on the

EVALUATION OF TECHNICAL FEASIBILITY OF INFRARED MISSILE DEFENSE ALARM FROM SATELLITE VEHICLES

Dr. Carl F. J. Overhage, Lincoln Laboratories
Massachusetts Institute of Technology
Dr. Sidney Passman, The Rand Corporation
Dr. Edward M. Purcell, Harvard University
Dr. Chalmers W. Sherwin, University of Illinois

26 February 1959

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We are impressed by the great promise of infrared detection and by the reassuring confirmation obtained in experiments so far of the basic physical relations involved. We regard this general approach to missile detection as one of the most important ones to bank on because of the inherent high emission of missile propulsive systems. Essentially we are dealing here with a simple method based on a few physical laws and one that can not readily be circumvented. We therefore urge most strongly that development and test flights of this missile detection system be pursued with top priority.

The satellite infrared detection system supplements the BMEWS radar system in many ways, principally by alerting it. It relies on different characteristics of the attacking missiles. In addition, the radar system gives later but confirmatory information on the data from the attack alarm system. The deception and countermeasure problems for the two systems are very different. Together, the two systems can give more reliable warning of barrage attack.

The review board has confined itself essentially to the question of the technical feasibility of long range detection of ICBM launchings from a satellite vehicle.

1. The detectibility of missiles when they are above the horizon has been convincingly demonstrated by the LOW CARD observations and by other data. The signal strength and ranges involved are such that there is little doubt that detection by the satellite at the required ranges (out to about 3,000 miles) can be achieved in the absence of background, namely when looking above the horizon or at night.

2. Detection of the missile against the daytime atmospheric background poses no serious problem so far as signal to internal system noise is concerned but there remain unanswered questions as to the seriousness of spatial background fluctuations, even though present limited evidence from balloon observations suggests this problem is solvable. More information is needed on background characteristics and on the technical complexities of necessary discrimination devices. Because of the question of the signal to background ratios, more exact knowledge of the radiance of the missile at all aspects and of the variation of radiance from one propulsive system to another is needed. The Board sees no physical reason to expect serious disappointment in this aspect of the problem but would nevertheless emphasize the urgency of settling this point by further experiments with aircraft, balloons, and satellites.

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The Board has not considered and cannot comment on the operational problems involved in the system utilization, other than to point out that they are so intimately related to system design as to require treatment in parallel. For example, should the signal to background problem appear too difficult, a way out appears possible through the mechanism of relying entirely on over-the-horizon scanning. In fact, it appears worthwhile to carefully consider this possibility now.

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Excerpts from "Final Report of the Ad Hoc Committee on Air Defense Systems," dated 15 January 59, Scientific Advisory Board, USAF

Recommendation 7: Infra-red Satellite Attack Alarm System

The development of the ballistic-missile-attack-alarm system proposed as a part of the USAF Sentry (WS-117L) system should be implemented at high priority. It should be more effective than BMEWS in giving timely warning of a barrage attack. The attack-alarm program as proposed by AFBMD should be approved, funded, and given the highest priority in the 117L program. We believe that the USAF should urge the defense department and other government departments to seek international control of this system if for no other reason than to prevent its destruction by hostile ground fire.

Discussion.

The attack-alarm system proposed as part of the Sentry program uses infra-red detection equipment which appears to be feasible for viewing the flame of high-thrust rocket engines, and instantaneous direct line-of-sight readout of detected signals to receiving stations on friendly territory. The mission of the attack-alarm system-- that of detecting and giving warning of a massive ICBM attack--is of the utmost importance.

Under these circumstances, the Committee recommends that the development of the attack-alarm system should be given the highest priority in the 117L program. ******

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